

27. On a New Cestode from an Albatross,
Diomedea irrorata. By H. A. BAYLIS, B.A.*

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(Text-figures 1-4.)

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Among some material presented to the British Museum by the Hon. N. C. Rothschild, one tube contained specimens of a small cestode collected from *Diomedea irrorata* Salvin by Dr. H. O. Forbes. Locality : Lobos de Tierra Island, Peru.

Examination of these specimens showed them to belong to the genus *Tetrabothrius* Rudolphi, to which in fact all the Cestodes found in this group of birds have been assigned. The species appears to be a hitherto undescribed one, for which I propose the name *Tetrabothrius strangulatus*, on account of the sudden constriction observed behind the head, which gives the animal the appearance of having had a thread tied round its neck.

TETRABOTHRIUS STRANGULATUS, sp. n. (Text-figures 1-4.)

External Features.

This is a very small form compared with most of the other species of the genus. The material is unfortunately in a rather fragmentary condition; the longest piece measured 57 mm. This fragment contained 222 proglottides, in the first 5 or 6 of which there were as yet no traces of genital organs developed. The only fragment which includes a head shows about 30 segments, in which there are no genital organs, and the length of this piece is about 3·5 mm., including the head. At the lowest computation, therefore, a complete specimen probably measures 60 mm. in length and contains about 250 proglottides. The maximum width attained is about 0·77 mm.

As already stated, only one head could be found among the specimens. It is of a somewhat oblong shape, flattened dorso-ventrally—*i.e.*, in the same direction as the strobila. At the apex it has a flattened area, from which arises a slight conical projection. The four suckers are large, placed at the anterior end of the scolex, and occupying less than half of its length. They have a considerable ear-shaped fleshy expansion antero-laterally, and their apertures are irregularly triangular in outline.

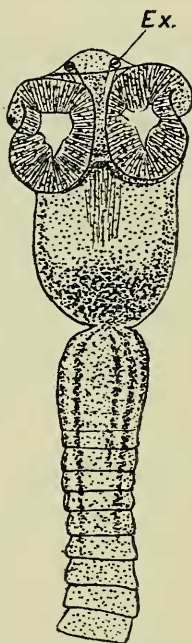
The total length of the head is 0·54 mm., while at its widest

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part (through the lappets of the suckers) it has a transverse measurement of 0·36 mm. Its width behind the suckers is 0·28 mm. The suckers are 0·22 mm. long, and 0·15 mm. broad in the middle of their length.

There is no rostellum, and no hooks.

Text-figure 1.



Head of *Tetrabothrius strangulatus*, \times ca. 70.

Ex. Aperture of excretory canal (paired).

All figures were drawn with Abbé's drawing apparatus.

The apex of the head bears two pairs of curious apertures in front of the suckers. These have the form of small, clear, circular areas, crossed by a minute transverse slit. They are probably apertures of the excretory canals, fine branches of which can be seen passing up to the openings in the head. A similar structure has been noted by von Linstow in *Tetrabothrius heteroclitus* [*T. auriculatus**]. Behind the head there is a sudden sharp constriction, forming an isthmus only 0·08 mm. in width. After this the width of the neck increases rapidly again to 0·17 mm.

Segmentation begins at about 0·25 mm. behind the constriction the earliest proglottides being about 0·05 mm. long by 0·14 mm.

* Voyage of H.M.S. Challenger, Report on Entozoa (1884), pp. 14-15.

wide. They increase rapidly in both dimensions on passing backwards, but are always broader than their length.

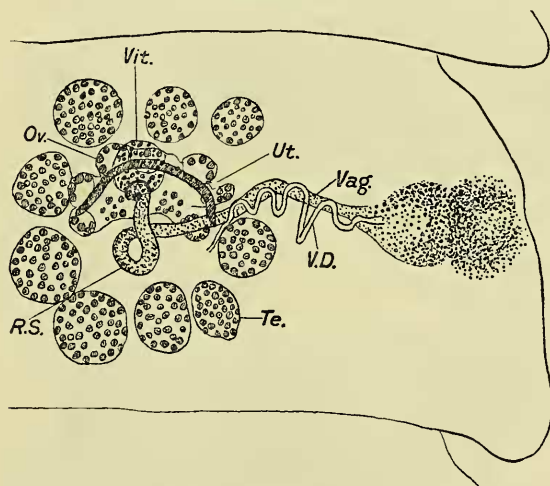
Internal Anatomy.

Musculature.—The longitudinal bundles of muscle-fibres are arranged in two layers, which are most strongly developed dorsally and ventrally. The outer layer consists of slightly smaller bundles than the inner layer, and is scantily developed towards the middle line of the segments, being more in evidence towards the sides. But neither layer is strongly developed quite up to the lateral margins.

The inner layer consists of about 25 to 30 bundles.

Transverse and dorso-ventral fibres are only feebly developed.

Text-figure 2.



Tetrabothrius strangulatus.

Semi-diagrammatic view of the anatomy of a young, sexually mature, segment, as seen from above by transparency.

Ov., Ovary; *R.S.*, the coil destined to become the receptaculum seminis; *Te.*, testes; *Ut.*, uterus; *Vag.*, vagina; *Vit.*, vitelline gland; *V.D.*, vas deferens.

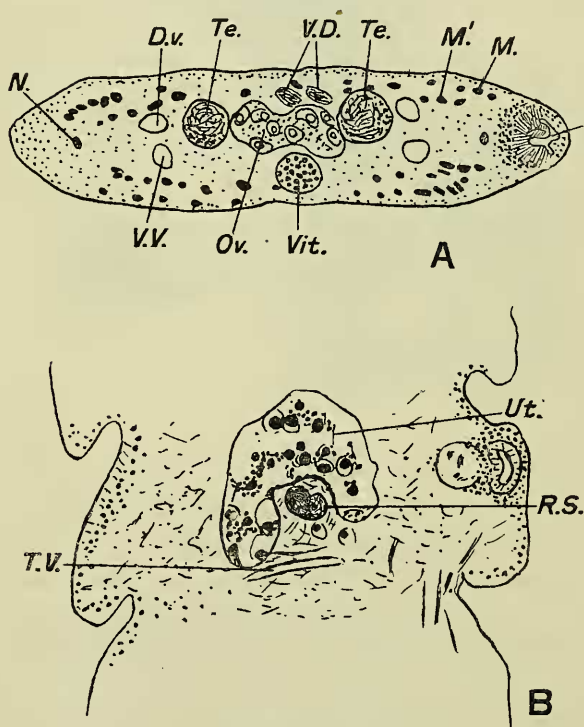
Nervous System.—The usual pair of longitudinal lateral nerves is present; they are situated slightly beyond the most lateral of the inner longitudinal muscles.

Excretory System.—As usual, two pairs of wide longitudinal lateral vessels are present. The dorsal pair is situated almost exactly vertically above the ventral pair, and are of nearly the same diameter. The ventral canals are connected in the posterior part of the segments by transverse vessels.

In the scolex fine canals can be seen running up to open by the peculiar slit-shaped apertures on the apical projection.

Genital Organs.—The testes are proportionately large, compared with those of other species of the genus, and are also remarkably few in number. They are nearly spherical, and have a diameter of about 0.055 mm. They are situated in the dorsal part of the central field of the proglottis, and arranged on a horseshoe plan round the other organs, which occupy the centre and more ventral parts. The two ends of the horseshoe are directed towards the right side of the animal, on which the genital pores are always situated, and the male and female genital ducts pass between them.

Text-figure 3.



Tetrabothrius strangulatus.

A. Transverse section through a sexually mature segment.

D.v., Dorsal excretory vessel; *G.A.*, genital atrium; *M.*, outer, *M'*, inner, longitudinal muscles; *N.*, lateral nerve; *Ov.*, ovary; *Te.*, testes; *V.D.*, vas deferens; *Vit.*, vitelline gland; *V.V.*, ventral excretory vessel.

B. Horizontal section through a gravid segment.

R.S. Receptaculum seminis; *T.V.*, transverse excretory vessel; *Ut.*, uterus.

The number of testes varies between 7 and 9, but the most usual number is 8.

The ovary is a somewhat loose and irregularly lobed organ in which the ova do not appear to be very closely packed. It occupies the greater part of the centre of the proglottides in the younger portion of the strobila.

Below the ovary, and extending a little in front of it, lies the large, rounded vitelline gland, while above the ovary, in young proglottides, the uterus appears as a very narrow crescentic tube with conspicuous cell-nuclei, the convexity of the crescent being towards the head of the worm.

In such a young segment, the genital ducts and apertures are difficult to separate, the common genital atrium being as yet imperfectly developed.

The vagina first appears as a rather wide canal running inwards from the thickening on the right side, which is to be the genital atrium; at first it runs a nearly straight course, with a slight forward inclination. It then turns backwards at an obtuse angle, and forms a remarkable loop, returning over itself and running upwards and forwards for a short distance, finally taking a sharp bend downwards and descending perpendicularly to the ovary. At the point where the backward loop of the vagina occurs, there is at first no perceptible enlargement of the duct, which appears to be of the same width throughout. But in older segments there is in this position an expansion to form a receptaculum seminis. In sections of the older proglottides this is always seen to occupy the space between the backwardly-directed "horns" of the uterus.

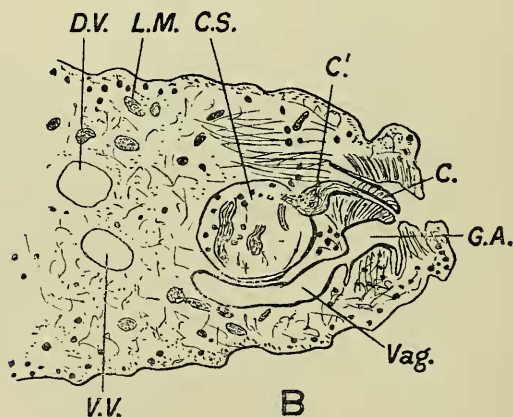
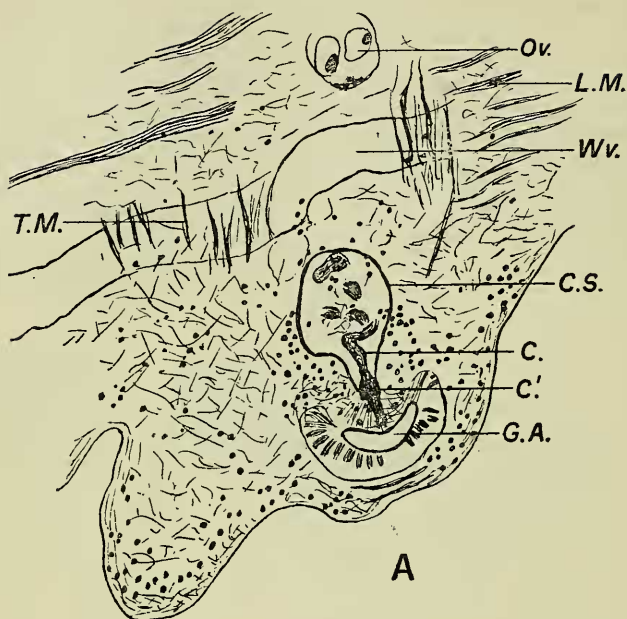
The vas deferens is, in young segments, with difficulty distinguished from the vagina, lying as it does above it, and following an approximately parallel course. Later it lengthens, widens, and becomes very elaborately coiled, at the same time becoming gorged with sperm. It comes to occupy a considerable part of the right side of the segment, its coils being concentrated mainly towards the anterior border.

Distally it passes into a large spherical cirrus-sac, which measures 0.055 mm. in diameter. Within this the duct continues to coil about, and finally passes out on the opposite side, as the cirrus, or male cloacal canal. This projects into the upper portion of a large genital atrium, with thick muscular walls. At the point where it leaves the cirrus-sac, the lumen of the cirrus shows a considerable dilatation, which is always found to be full of sperm. This may perhaps be regarded as serving the purpose of a seminal vesicle, no other organ of that kind, apparently, being present.

Immediately below the male cloacal canal lies the opening of the vagina, which passes inwards from the genital atrium, below the cirrus-sac, curves upwards behind this to pass between the dorsal and ventral excretory vessels, and thence passes, as described, to the ovary.

As the proglottides grow older, the uterus is seen to enlarge at

Text-figure 4.

*Tetrabothrius strangulatus.*

A. Portion of a horizontal section through a sexually mature segment.

B. Portion of a transverse section passing through a genital atrium and cirrus-sac.

C, Cirrus ("male cloacal canal"); C', dilated portion of cirrus; C.S., cirrus-sac; D.V., dorsal excretory vessel; G.A., genital atrium; L.M., longitudinal muscles; Ov., Ovary; T.M., transverse muscle-fibres; Vag., vagina; V.V., ventral excretory vessel; Wv., excretory canal.

the expense of the ovary. At first it keeps its well-defined crescentic shape, but becomes crammed with ova, and finally expands so as to occupy nearly the whole of the segment. Meanwhile the rest of the genital organs become broken down and disappear, though for a long time the outlines of the now vacant testes can be seen, and the receptaculum seminis and vas deferens are still distinguishable by reason of the spermatozoa contained in them.

General Remarks.

Tetrabothrius strangulatus is distinguished from other members of the genus by some interesting peculiarities, quite apart from its size, which is unusually small.

One of its most distinctive features is the very sharp demarcation of the head from the neck, giving the worm a "strangled" appearance. In other forms the head, behind the suckers, usually passes almost imperceptibly into the neck, and there is not, as in this species, any considerable portion of the head between the posterior border of the suckers and the beginning of the neck.

The small number of testes is also characteristic. As stated previously, they do not exceed 9 in number, and the usual complement is 8. In the majority of species of this genus there are at least 22 testes (according to Fuhrmann). There may be almost any number up to 60, and the number in a given species generally varies slightly, but only in one species hitherto described are there as few as 8 (*T. monticellii* Fuhrm., from *Fulmarus glacialis*. Testes 8-12).

In the general arrangement of its internal organs *T. strangulatus* approaches closely to *T. heteroclitus* Diesing. But this is a considerably larger form, and its testes, though arranged somewhat similarly in a rosette or horseshoe pattern, are much more numerous, and smaller in proportion. Fuhrmann* gives the number as 28, but in some specimens in the British Museum I have counted 43 in several successive segments, and sometimes an even larger number (probably about 50)†.

In conclusion it may be mentioned that hitherto no species of *Tetrabothrius*—nor, so far as I am aware, any other Cestode—has been recorded from *Diomedea irrorata*.

* Proc. Roy. Soc. Edinburgh, xxii. 1899, p. 649.

† The specimens of *T. heteroclitus* referred to are the types of "*Tænia diomedæ*" v. Linst. and "*Tænia suliceps*" Baird, respectively, both of which Dr. Fuhrmann considers identical with *Tetrabothrius heteroclitus* Dies. After examining specimens of both, in spite of the discrepancy in the number of testes—43 in "*T. diomedæ*"; about 50 in "*T. suliceps*"—I have no doubt that this view is correct.